

# **SECCHI Status**

**R.A. Howard**

**Presentation to STEREO SWG**

**22 March 2004**

**Boulder, Colorado**



# Outline

---

- **Instrument Status**
- **Data Products**
- **Data Display**
- **Beacon Data**
- **Observation Timing**
- **First Light Press Releases**
- **3D Visualization Status**



# Instrument Status

---

- **Flight Hardware Development Is Well Underway**
  - **Delivered:**
    - **Flight Shutter and Polarizer/filter Wheel Mechanisms**
    - **Flight Focal Plane Assemblies With Ccds**
    - **SCIP Bench**
  - **“First Light” on FM EUVI and COR2 Telescopes**
  - **MEB, CEB in Unit Level Environmental Testing**
  - **Final Fabrication: COR1, GT, SEB**
  - **HI Well Underway**
- **Manufacturing Problems Have Caused Extensive Replanning of Schedule**
  - **E.G. Coating Problems in All Countries Have Been Surprising**
  - **Fab of PC Boards Has Shown Lifting of Traces**
- **Mass Is a Major Issue**
  - **SCIP Bench Has Measured More Than Expected**
  - **Harness Between Electronics and Telescopes Is Longer (Heavier) Than Estimated**



# Instrument Performance Status

---

- **No descoping of instrument performance has occurred in parameters that have been measured to date**
- **No descoping is foreseen**



# Data products

---

- **Catalogs and FITS Images of the Data**
- **Movies**
  - **Multipanel Synchronized to 2 (3?) Spacecraft and Multiple Sensors**
  - **Anaglyph**
  - **Formats (2Kx2K and 1Kx1K)**
    - **GIF/PNG, MPEG I or II**
  - **Must Meet Needs of Amateur Comet Hunters**
- **Synoptic Maps Showing Intensity at Selected Heights**
- **Lists (Automatically Generated)**
  - **CME, Prominence or Filament Eruption, Disappearance**
  - **Coronal Holes, UV Waves and Dimmings**
  - **Total Flux in EUV**



# Data Display

---

- **Display Capabilities**
  - **Anaglyph Prints Viewed With Red/blue Glasses**
  - **Stereo Image Pairs Viewed on Crt/projector With LCD Goggles**
  - **Coronal “Fly Through”**
  - **Orbit Display With Planet Locations**
  - **Movies From Up To 3 Locations**
  - **Inset of One Image Type Into Another Type**
- **STEREO Browser**
  - **Interface to Instrument Databases Is Via VSO Data Query**
  - **Thumbnails Customizable by User to Incorporate Any VSO Compatible Data Set**
  - **Should Display All the Instruments Plus Modeling Output (S) Tying Remote Sensing to In-situ**



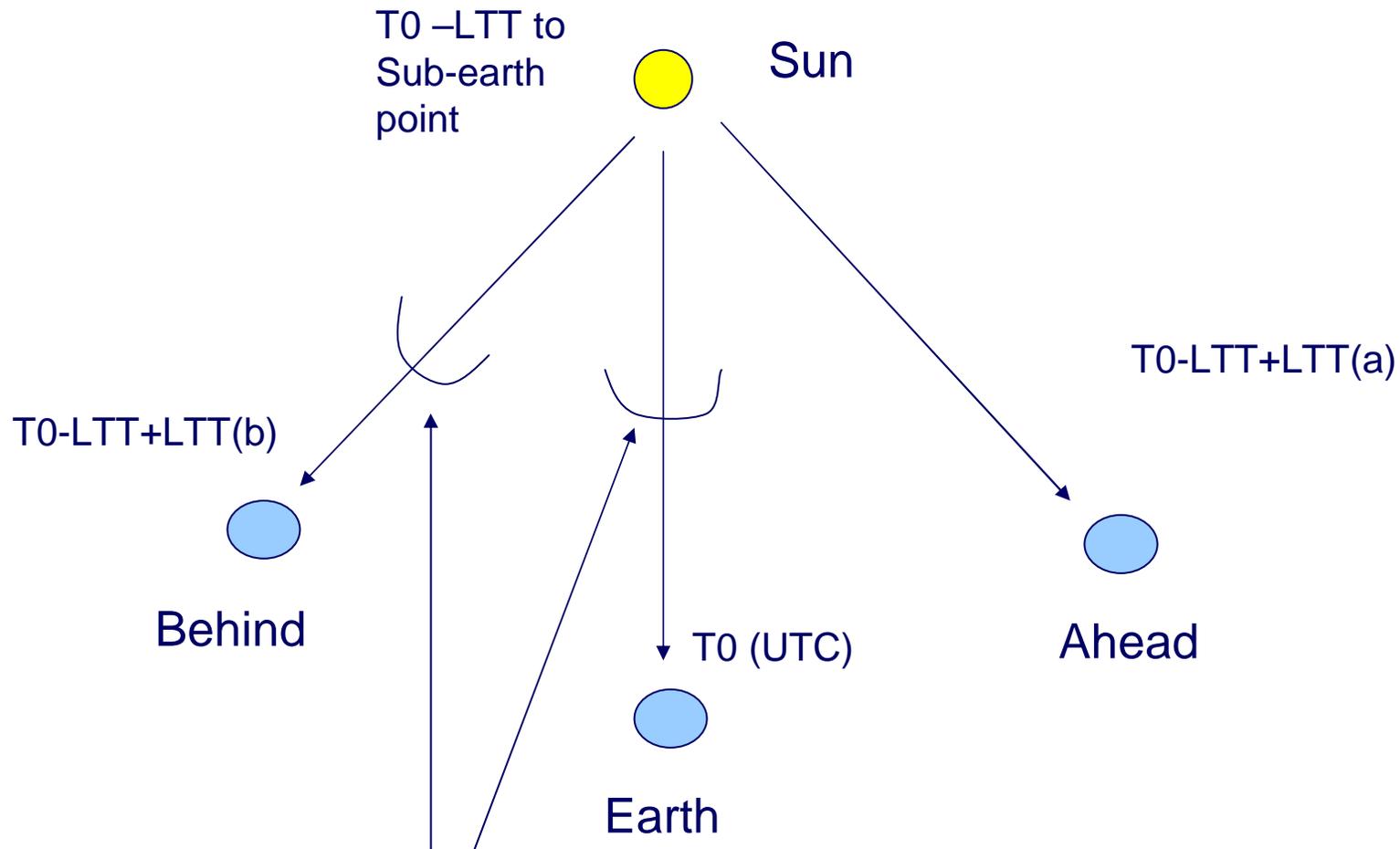
# Beacon Data

---

- **NOAA Is the Prime User**
- **Objective Is to Provide Sufficient Visibility to**
  - **Identify When CME Has Been Launched Toward Earth**
  - **Track CME Through Space**
  - **Provide a Warning and Then Better Indication of Impact**
- **Software (Ground)**
  - **Reconstitute (Low Resolution) Image**
  - **Background Removal**
  - **Automatic Detection of CME.**
    - **During Extended Phase – Automatic Detection Will Be Performed On-board**
  - **Reformat to Utilize Existing CME Measuring Software**
- **Data Type**
  - **Reduced Resolution Images**
  - **Exact Definition Is Uploaded at the Time of Operations (Weekly)**



# Observation Timing



Need to be able to synchronize observations based on actual location of the CME



# “First Light” Press Releases

---

- **Topics Under Consideration**
  - **3D Deconvolution of EUV Structures**
    - **Loops, Prominence**
  - **3D Deconvolution of Coronal Structure**
    - **Streamer, Coronal Hole, Polar Plumes, Cmes**
      - **Good Opportunities Apt to Be Present Immediately Except for Cmes, for Which a Good Opportunity Might Not Be Present for Some Time**
      - **Would Involve 1-5 Days of Observations**
  - **3D Deconvolution of Streamer Belt and the Inner Heliosphere**
    - **Would Involve 14-27 Days of Observation**
    - **Could Include All Stereo Instrument Data Plus Modeling**
- **Data Must Be Embargoed Before Release**
  - **Implies That 1st Observations Should Not Be Put Onto Web Immediately**
- **Public Interest in Data Is Greatly Enhanced If They Are Real-time. The Interest Is Lessened the Less Real-time It Is. Therefore We Must Prevail on APL to Make the Data Available Quickly**



# 3D Visualization

---

- **3D Deconvolution**

- **Pixon Method Chosen for Speed (Large # Voxels, up to  $10^9$ ): Small Number of Iterations, Intelligent Guidance to Declining Complexity Per Iteration. Sample Times Have Been  $32 \times 32 \times 32 < 15$  Minutes,  $64 \times 64 \times 64 \sim 60$  Minutes,  $128 \times 128 \times 128 \sim 6$  Hrs, (1 Ghz PC).**
- **Minimum Complexity: With This Underdetermined Problem, We Make Minimal Assumptions in Order to Progress. Another Possibility Is Forward Modelling, I.E. Parameter Fitting. Complementary Approach.**
- **Received Cme Models From J. Chen, P. Liewer, S.T. Wu and Z. Mikic, and Have Used Them to Generate a 3D Reconstruction**
- **Example of the Results of the Deconvolution for the Chen Model Are Shown in the Next Slide**
- **Future Work**
  - **Continue Refining Reconstruction Algorithm, I.E. Hierarchical Gridding**
  - **Continue Investigating Range of Density Structures Vs. Signal-to-noise.**
  - **Use Lasco/eit Data for Rotational Tomography.**
  - **Time Dependent Reconstructions**

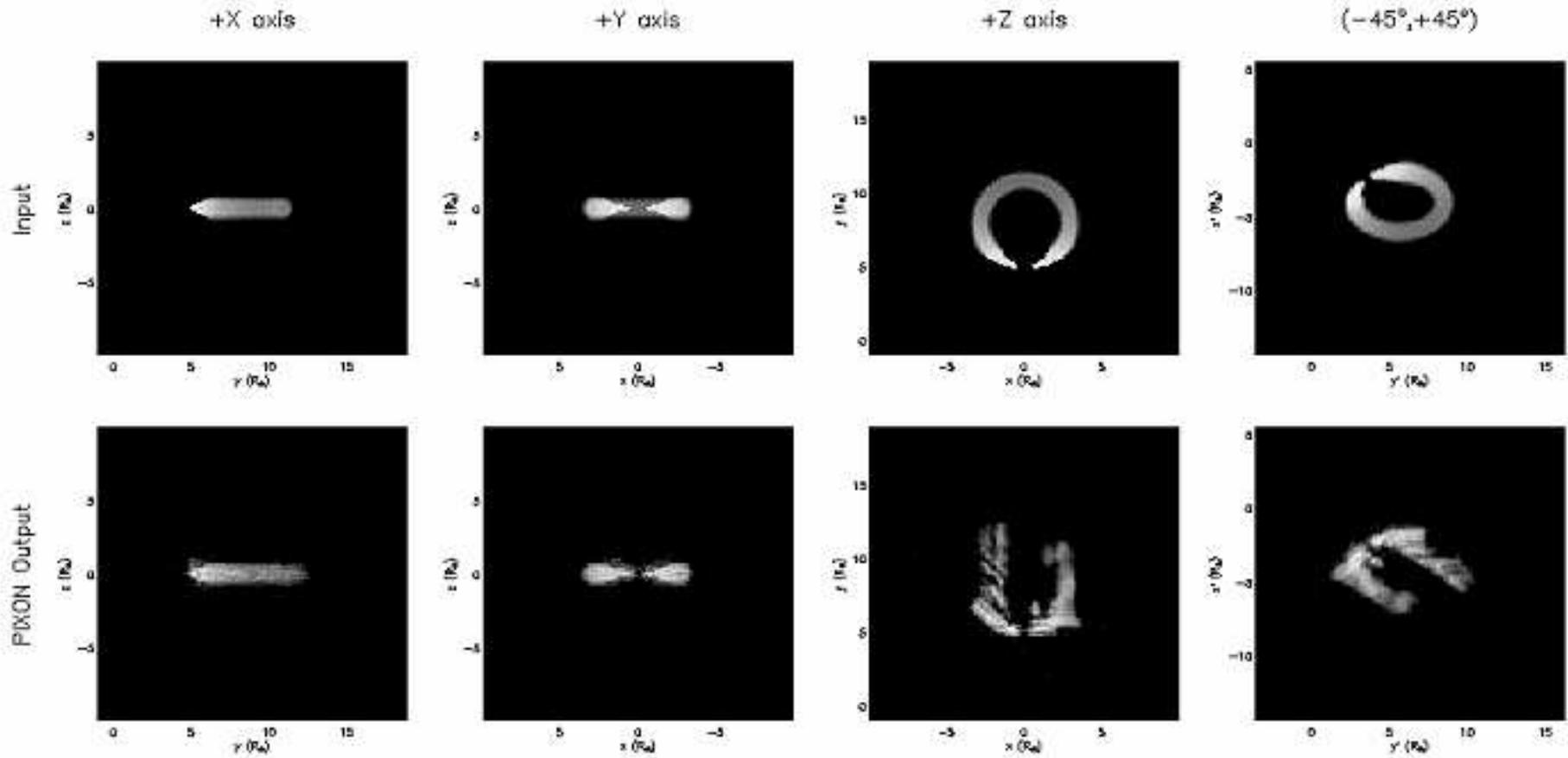
- **Forward Modeling Program Using Conceptual Structures Is Underway**



# 3D Reconstruction: CME model (J. Chen)

## Three Ecliptic Viewpoints

Figure 5. IMAGES Visualized from Principal Viewpoints  
Column Density, Infinite Geometry



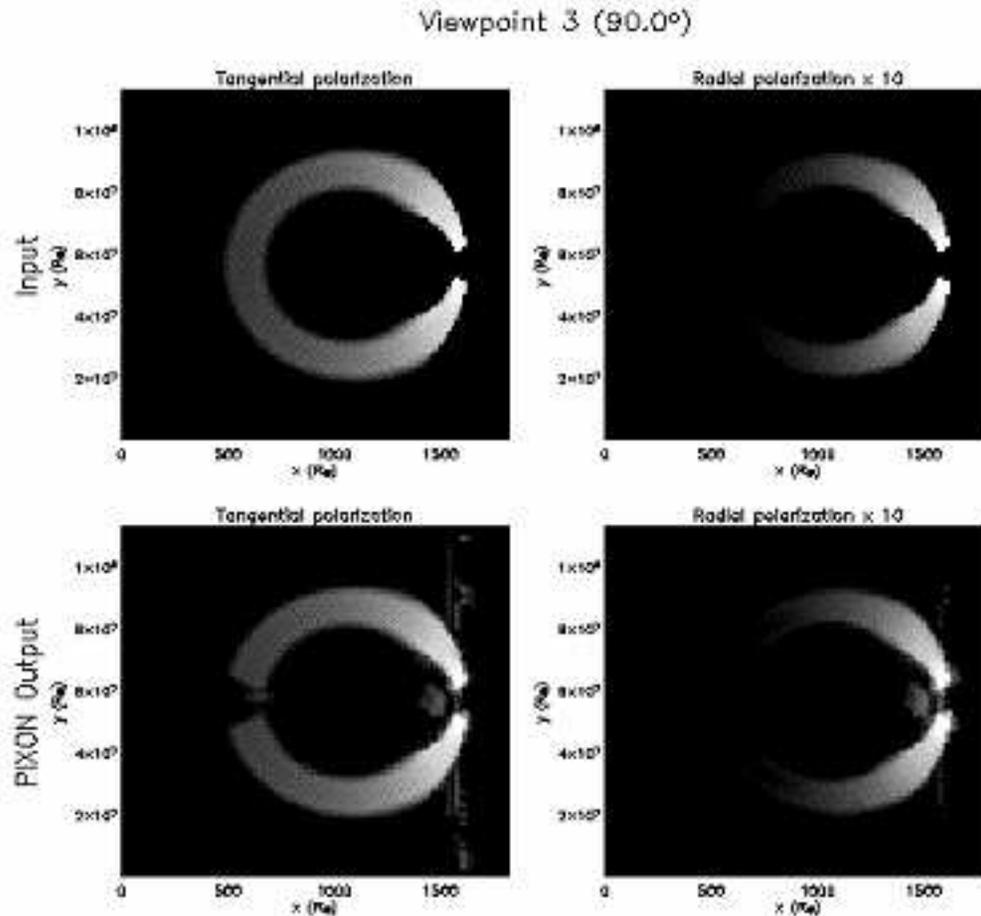
Logarithmic [4.00e+14, 2.00e+19] electrons cm<sup>-2</sup>

pixan3\_sutchen\_128\_04\_04.dat\*\*\*\*\*



# 2 Views in Ecliptic and 1 Above Ecliptic

Figure 2. Rendered DATA



Logarithmic [6.00e+11, 2.00e+16] photons  $\text{sec}^{-1} \text{cm}^{-2} \text{sr}^{-1}$

